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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,855	02/07/2006	Junichiro Nakayama	63004(70868)	5425

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EDWARDS ANGELL PALMER & DODGE LLP
P.O. BOX 55874
BOSTON, MA 02205

EXAMINER	
SLUTSKER, JULIA	
ART UNIT	PAPER NUMBER
2891	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/526,855	NAKAYAMA ET AL.	
	Examiner	**Art Unit**	
	JULIA SLUTSKER	2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 December 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 December 2010* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jung (US 2002/0179004) in view of Okumura (US 6, 372, 039).

Regarding claim 1, Jung discloses a laser processing method for crystallizing an amorphous material by irradiating a layer formed of the amorphous material constituting a substrate or a layer formed of an amorphous material on a substrate with a laser beam, comprising: irradiating a first region defined on a surface of the layer formed of the amorphous material with a laser beam so that the amorphous material in the first region is melted ([0050], Fig.5A, E1); solidifying and crystallizing the molten amorphous material in the first region ([0051]); irradiating a second region that is defined on the surface of the layer formed of the amorphous material (Fig.5A, E2) and overlaps the first region in a predetermined portion thereof (Fig.5A, F) with a laser beam so that the amorphous material in the second region is melted ([0053]); solidifying and crystallizing the molten amorphous material in the second region ([0051)]; moving a region that is to be irradiated with a laser beam in a predetermined direction by a predetermined distance (Fig.5A, E3)), and newly defining a first region on the surface of the layer formed of the amorphous material so as to partially overlap a immediately previous

second region (Fig.5A, F); and repeating irradiation of the laser beam on the surface of the layer formed of the amorphous material and movement of a region that is to be irradiated with the laser beam ([0055], [0056]) until a crystalline region of the amorphous material reaches a desired size (Fig.5C).

Jung does not disclose the amorphous material in a molten state in the first and/or the second regions is irradiated with an additional laser beam which has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt.

Okumura however discloses using an additional laser light source (Fig.9, numeral 601) for emitting a laser beam for irradiation the amorphous material in a molten state in the first or second regions (column 8, lines 57-67), the laser beam which has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt (column 6, lines 14-25; note energy density of the laser beam lower than microcrystallization threshold value).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify Jung with Okumura to have the amorphous material in a molten state in the first or second regions is irradiated with an additional laser beam which has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt for the purpose of increasing uniformity of crystal grain size (Okumura, column 2, lines 10-20)

Regarding claim 2, Jung discloses that the first and the second regions are defined as a rectangle shape on the surface of the layer formed of the amorphous material (Fig.4).

Regarding claim 5, Jung discloses that the first region and the second region intersect with each other (Fig.5B).

3. Claims 1, 3, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park (US 6, 326, 286) in view of Okumura.

Regarding claim 1, Park discloses a laser processing method for crystallizing an amorphous material by irradiating a layer formed of the amorphous material constituting a substrate or a layer formed of an amorphous material on a substrate with a laser beam, comprising: irradiating a first region defined on a surface of the layer formed of the amorphous material with a laser beam so that the amorphous material in the first region is melted (Fig.7A); solidifying and crystallizing the molten amorphous material in the first region ([column 7, lines 5-15); irradiating a second region that is defined on the surface of the layer formed of the amorphous material (Fig.7B) and overlaps the first region in a predetermined portion thereof with a laser beam so that the amorphous material in the second region is melted (Fig.7B; column 7, lines 40-50)); solidifying and crystallizing the molten amorphous material in the second region (column 7, lines 45-50); moving a region that is to be irradiated with a laser beam in a predetermined direction by a predetermined distance (column 7, lines 50-55), and newly defining a first region on the surface of the layer formed of the amorphous material so as to partially overlap a immediately previous second region (Fig.7B); and repeating irradiation of the

laser beam on the surface of the layer formed of the amorphous material and movement of a region that is to be irradiated with the laser beam until a crystalline region of the amorphous material reaches a desired size (Fig.7C).

Park does not disclose the amorphous material in a molten state in the first and/or the second regions is irradiated with an additional laser beam which has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt.

Okumura however discloses using an additional laser light source (Fig.9, numeral 601) for emitting a laser beam for irradiation the amorphous material in a molten state in the first or second regions (column 8, lines 57-67), the laser beam which has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt (column 6, lines 14-25; note energy density of the laser beam lower than microcrystallization threshold value).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify Park with Okumura to have the amorphous material in a molten state in the first or second regions is irradiated with an additional laser beam which has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt for the purpose of increasing uniformity of crystal grain size (Okumura, column 2, lines 10-20)

Regarding claim 3, Park discloses that the first and the second regions on the surface of the layer formed of the amorphous material are defined as a sawtooth shape (Fig.16; numeral 162).

Regarding claim 4, Park discloses that the first and the second regions are defined on the surface of the layer formed of the amorphous material as an arch shape (Fig.8).

4. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka (US 2003/0024905) in view of Okumura.

Regarding claim 7, Tanaka discloses a laser processing apparatus which crystallizes an amorphous material by irradiating a layer formed of the amorphous material constituting a substrate or a layer formed of an amorphous material on a substrate with a laser beam, comprising: a light source ([0086]) for emitting a laser beam (Fig.3, 110a, 110a, 100c); a first projection mask (Fig. 3, numeral 112a; [0086], since grating is used to shape a laser beam, (112a) is considered as a projection mask); provided in an optical path of a laser beam (110a) formed between the light source and the layer formed of the amorphous material (106) so as to define a first region on as surface of the layer formed of the amorphous material by letting the laser beam emitted from the light source pass through (113a); and a second projection mask (112b) provided in an optical path of a laser beam formed (110b) between the light source and the layer formed of the amorphous material (106) so as to define a second region on the surface of the layer formed of the amorphous material by letting the laser beam emitted from the light source pass through (113b).

Tanaka does not disclose an additional laser light source for emitting a laser beam for irradiating the amorphous material in a molten state in the first and/or the second regions, said laser beam emitted from the additional laser light source having an

energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt.

Okumura however discloses using an additional laser light source (Fig.9, numeral 601) for emitting a laser beam for irradiation the amorphous material in a molten state in the first or second regions (column 8, lines 57-67) the laser beam which has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt (column 6, lines 14-25; note energy density of the laser beam lower than microcrystallization threshold value).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify Tanaka with Okumura to have an additional laser light source for emitting a laser beam for irradiation the amorphous material in a molten state in the first or second regions, the laser beam which has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt for the purpose of increasing uniformity of crystal grain size (Okumura, column 2, lines 10-20)

Regarding claim 8, Tanaka discloses a first laser light source (Fig.18, numeral 100a) for emitting a laser beam for irradiating the first region and a second laser light source (Fig.18, numeral 100b) for emitting a laser beam for irradiating the second region.

Regarding claim 9, Tanaka in view of Okumura does not disclose that a wavelength of laser light emitted from the additional laser source is longer than a wavelength of laser light emitted from said layer light source.

Okumura however discloses irradiating by first and second laser pulse having different micro-crystallization threshold values (Fig.8A, column 14, lines 21-45). Okumura also discloses that micro-crystallization threshold values depend on a wavelength of the laser pulse (column 7, lines 35-45).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to adjust a wavelength of laser light emitted from the additional laser source for the purpose of optimization the micro-crystallization threshold values and obtaining crystal grain uniformity (Okumura, column 15, lines 26-35).

Response to Arguments

5. Applicant's arguments filed 12/06/2010 have been fully considered but they are not persuasive.

6. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., using two masks) are not recited in the rejected claims 1-5. Similarly, the rejected claim 7 does not require "providing overlapping radiation regions" as applicant argued. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

7. Applicant's arguments that Okumura does not disclose that an additional laser beam has an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt are not persuasive, since Okumura discloses using two laser beam source (Fig.9, numeral 601, 602) with one of them having a beam

profile which includes a region having an energy density which is lower than a microcrystallization threshold value (column 6, lines 15-25). Microcrystallization threshold value is defined as a critical energy beyond which the crystal grains are formed (column 6, lines 65-67; column 7, lines 1-4) i.e. an energy density lower than microcrystallization threshold value is an energy amount lower than the energy amount necessary for the amorphous material in a solid state to melt.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JULIA SLUTSKER whose telephone number is

(571)270-3849. The examiner can normally be reached on Monday-Friday, 8 a.m.-5 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keisha Bryant can be reached on (571)-272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JS
February 4, 2011

/Asok K. Sarkar/
Primary Examiner, Art Unit 2891
February 7, 2011